

SHIP ISLAND, MISSISSIPPI: AN EXAMPLE OF RAPID HURRICANE-DRIVEN  
EVOLUTION

Keil SCHMID

Mississippi Office of Geology

PO Box 20307

Jackson, MS 39289

Schmid@deq.state.ms.us

Barbara Yassin

Mississippi Office of Geology

PO Box 20307

Jackson, MS 39289

Barbara\_yassin@deq.state.ms.us

East and West Ship Islands, located ten miles offshore of Biloxi, Mississippi, are quickly evolving Gulf Coast barrier islands that still bear the scars from Hurricane Camille. Rapid evolution in the island's extent, especially since being breached by the 1947 Hurricane and then permanently by Camille, coupled with facies changes suggest an equilibrium imbalance, and an uncertain future for these historic and popular islands. Ship Island is the most visited of the Gulf Islands National Seashore islands in Mississippi. Visitors are ferried there to enjoy the beach and wildlife, and tour historic Fort. Massachusetts. Ship Island is the only Mississippi Island with a substantial infrastructure, and also shelters the highly developed coastline between Biloxi and Long Beach, Mississippi.

Ship Island has evolved differently than Horn and Petit Bois islands in the Gulf Islands National Seashore to the east and Cat Island to the west. Both Petit Bois and Horn islands have maintained a westward translation - a result of the dominant southeast wind regime of the northern Gulf of

Mexico. Cat Island has a separate evolution driven historically by its proximity to the Bernard Delta lobe. Now partly exposed to the dominant wave and wind direction, it is adjusting to current conditions. Ship Island, which partially protects Cat Island, has a history of shoreline retreat/progradation as opposed to westward migration.

Since Ship Island was severed, the two resulting islands have evolved uniquely; and taken in total, have experienced heightened erosion. W. Ship Island, the location of Fort Massachusetts, has a higher elevation and a larger sand resource. It has remained a fairly stable fixture on the coast, possibly as a result of an updrift sand source on E. Ship Island. E. Ship, however, has experienced rapid fluctuations. For example, during the most recent storm, Hurricane Georges, the island's area was reduced by 25%, which is four times the change experienced by W. Ship. Morphologic changes on E. Ship are occurring as rapidly as area fluctuations. E. Ship is no longer fronted to the open gulf by a long sand beach; it is now typified by a series of pocket beaches separated by marsh headlands and tree hammocks. An entire 1.5-mile long section was completely breached during Hurricane Georges. This area is slowly reestablishing itself as a low elevation sand spit landward of its previous orientation. It is not clear whether landward migration of the spit, a substantial sand resource on the island, will ultimately de-couple sediment supply to W. Ship Island causing an increase in erosion and vulnerability to hurricanes.

The near-term costs associated with the rapid evolution of Ship Island seem minimal; however, longer-term effects could prove more costly. Rapid changes in island extent may alter sound circulation, displace habitats, and increase salinities. Moreover, hurricane and wave protection afforded by the island to the developed and continuously eroding mainland shore will be reduced.